

Appl. No.: 09/857,635  
Group Art Unit: 1712  
Applicants' Response to Paper No. 9

### REMARKS

Claims 11-32 are currently pending in the present application.

In Paper No. 9, the Examiner indicates that claim 32 is allowed, and that claims 16, 19 and 27, while objected to as being dependent upon a rejected base claim, would be allowable if rewritten in independent form.

However, in Paper No. 9, the Examiner rejects claims 11-15, 17, 18, 20-22, 24-26 and 28-31 under 35 U.S.C. §102(b), as being anticipated by U.S. Pat. No. 4,732,213 of Bennett, *et al.* (hereinafter referred to as "Bennett"). Specifically, the Examiner contends that Bennett discloses "a silica sol based fluid for consolidating soils which comprises a colloidal silica within the scope of the present invention", and that Bennett also discloses the use of polycarboxylic acids in the silica sols. (*See*, Paper No. 9, p. 2, ¶ 2). On this basis, the Examiner argues that the claims are anticipated. Applicants respectfully traverse the Examiner's rejection and the arguments and contentions in support thereof for the following reasons.

In order for a rejection under 35 U.S.C. §102 to be proper, each and every element of the claimed invention must be taught, either expressly or inherently, in a single prior art reference. (*See, e.g.*, M.P.E.P. §2131). Applicants submit that Bennett fails to teach each and every element of the claimed invention.

One embodiment of Applicants' claimed invention is directed to compositions comprising: (a) an aqueous silica sol, wherein the composition contains SiO<sub>2</sub> in an amount of from 2 to 40% by weight based upon the weight of the composition; and (b) from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of inorganic polyphosphates, phosphonic acids, aminoethylene phosphonic acids, phosphoric acid esters, phosphonocarboxylic acids, polycarboxylics, and mixtures thereof. Another embodiment of Applicants' claimed invention is directed to methods of sealing and/or consolidating loose and/or permeable materials by contacting the materials with components (a) and (b).

It is respectfully submitted that Bennett fails to teach the claimed component (b) in the claimed amount of from 0.01 to 400 ppm. Bennett discloses the addition of a chelating agent which may be selected from nitriloacetic acid and/or sodium citrate, *i.e.*, polycarboxylic

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species. However, Bennett fails to teach the claimed amount of hardness stabilizer. As indicated in Bennett, the addition of the calcium chloride and chelating agent is intended to delay gel formation by at least several hours. (*See*, Bennett, col. 9, lines 29-45). The incorporation of hardness stabilizers in amounts greater than those which are claimed would delay the stabilization of the claimed sol.

Applicants respectfully submit that Bennett fails to teach each and every element of the claimed invention. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b), based upon Bennett are respectfully requested.

In Paper No. 9, the Examiner rejects claims 21 and 22 under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 2,281,810 of Stone (hereinafter referred to as "Stone"). Specifically, the Examiner contends that Stone discloses earth consolidation compositions which contain an aqueous silica sol and a phosphonic acid. On this basis, the Examiner argues that the claims are anticipated. Applicants respectfully traverse the Examiner's rejection and the arguments and contentions in support thereof for the following reasons.

It is respectfully submitted that Stone fails to teach the claimed component (b) in the claimed amount of from 0.01 to 400 ppm. Stone discloses the addition of a polybasic acid to the silica sol to delay the setting of the gel. As shown in the examples, the set time is well over an hour, and often, at least a couple of hours. (*See*, Stone, page 4, Table 1). Stone fails to teach the claimed amount of hardness stabilizer. The incorporation of hardness stabilizers in amounts greater than those which are claimed would delay the stabilization of the claimed sol.

Applicants respectfully submit that Stone fails to teach each and every element of the claimed invention. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b), based upon Stone are respectfully requested.

In Paper No. 9, the Examiner rejects claims 21 and 23 under 35 U.S.C. §103(a), as being unpatentable over Bennett or Stone. Specifically, the Examiner contends that Bennett and Stone teach the claimed invention as described above with respect to the rejections under 35 U.S.C. §102(b). The Examiner acknowledges that neither Bennett, nor Stone, teaches the sequential addition of a silica sol and a polycarboxylic acid. However, the Examiner argues that

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steps taken concurrently are equivalent to steps taken successively. The Examiner argues that it would have been obvious to one of ordinary skill in the art to do sequentially what is disclosed concurrently. On this basis the Examiner argues that the claims are unpatentable.

Applicants respectfully traverse the Examiner's rejection and the arguments and contentions in support thereof for the following reasons.

It is well-settled that in order to establish a *prima facie* case of obviousness based upon a single reference, and thus shift the burden of proving non-obviousness onto Applicants, the Examiner MUST satisfy each of the following three criteria: (1) the reference must contain a teaching or suggestion which would motivate one of ordinary skill in the art to modify the reference as suggested by the Examiner (it is not sufficient to say that the reference can be modified without a teaching in the cited reference to suggest the desirability of such a modification); (2) there must be a reasonable expectation of success; and (3) the reference must teach or suggest each and every element of Applicant's claimed invention. The teaching or suggestion to modify the cited art and the reasonable expectation of success must both be found in the prior art and not in Applicants' Specification. (M.P.E.P. §2143).

Neither Bennett, nor Stone, teaches or suggests the claimed hardness stabilizer in the claimed amounts. Both Bennett and Stone teach the use of polycarboxylic acid species in comparatively larger amounts for the purpose of significantly delaying set time of a resulting sol-gel. Nothing in either reference would motivate one of ordinary skill in the art to use significantly lower amounts of the claimed hardness stabilizer. Additionally, based upon the express teachings in Bennett and Stone to use significantly greater amounts, one of ordinary skill in the art would have no reasonable expectation of success in using a decreased amount of "gelling agent".

Accordingly, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness, as none of the three criteria necessary to establish a *prima facie* case of obviousness has been satisfied. Thus, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §103(a), based upon Bennett or Stone.

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Lastly, in Paper No. 9, the Examiner rejects claims 11-15, 17, 18 and 20 under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,465,403 of Skee (hereinafter referred to as "Skee"). Specifically, the Examiner contends that Skee discloses "a silica sol containing composition which comprises chelating agents, such as polycarboxylic acids . . . ." (See, Paper No. 9, p. 3, ¶ 6). The Examiner acknowledges that Skee fails to disclose a specific example of a composition containing the sol and a chelating agent in an amount of from 0.01 to 400 ppm. However, the Examiner argues that Skee discloses that "the chelating agent may be present at a level as low as 100 ppm." (See, *id.*). On this basis the Examiner argues that the claims are unpatentable.

Applicants respectfully traverse the Examiner's rejection and the arguments and contentions in support thereof for the following reasons.

First, Skee is directed to basic compositions containing silicates for cleaning semiconductor wafer substrates in the microelectronics industry. This reference has virtually nothing to do with the use of aqueous silica sols for the solidification of earth surrounding bore holes in the drilling industry. One aspect of Skee which is indicative of this distinction is the amount of the silicate component included in the disclosed composition. Skee teaches the inclusion of from about 0.01 to 2 % by weight of a metal ion-free silicate. Applicants' claimed compositions comprise an aqueous silica sol, wherein the composition contains SiO<sub>2</sub> in an amount of from 2 to 40% by weight based upon the weight of the composition.

Second, as the Examiner has pointed out, the reference fails to teach the use of the claimed component (b) in the claimed amount of from 0.01 to 400 ppm. While Skee appears to indicate that the disclosed chelating agent may be present in the semiconductor wafer cleaning composition in an amount of from 0.01 to 10% by weight, there is no teaching or suggestion in the reference which would motivate one of ordinary skill in the art to combine an aqueous silica sol, wherein the composition contains SiO<sub>2</sub> in an amount of from 2 to 40% by weight based upon the weight of the composition, and from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of inorganic polyphosphates, phosphonic acids, aminoethylene

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phosphonic acids, phosphoric acid esters, phosphonocarboxylic acids, polycarboxylics, and mixtures thereof.

Skee fails to teach or suggest each and every element of the claimed invention, fails to motivate one of ordinary skill in the art to modify its teachings in order to arrive at the claimed invention and fails to provide one of ordinary skill in the art with a reasonable expectation of success.

Accordingly, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness, as none of the three criteria necessary to establish a *prima facie* case of obviousness has been satisfied. Thus, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §103(a), based upon Skee.

In view of the remarks set forth above, Applicants submit that all pending claims comply with 35 U.S.C. §112, and patentably distinguish over the prior art of record and known to Applicants, either alone or in combination. Accordingly, reconsideration, withdrawal of the rejections and a Notice of Allowance are respectfully requested.

Respectfully submitted,

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